IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: David Harold Woolstencroft	§	Group Art Unit: 1771
Application No.: 09/937,486	§	Examiner: Not Yet Known
Filed: September 26, 2001	§	Docket: 00001-01 (1590.94)
For: Composite Comprising Structural And Non Structural Fibers	§	Date: March 10, 2004

Request for Reconsideration

Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the September 10, 2003 Office Action, a three month extension of time having been requested and the requisite fee having been paid, reconsideration and withdrawal of the outstanding rejection of claims 1-8 and 10-29 are respectfully requested in view of the following arguments.

Claim Rejections – 35 USC § 102

Claims 1-6, 8, 10, 12, 13, 19, 20 are rejected under 35 USC §102 for allegedly being anticipated by EP 632 087. This rejection is hereby traversed.

The present invention is directed to a composite comprising a structural component and a resin component (claim 1) and a method of making a composite comprised of forming a preform (claim 19). The structural component comprises structural fibers and a toughening additive comprising non structural thermoplastic fibers. The resin component comprises a non-thermoplastic material and the structural component is a preform comprising an assembly formed from the structural fibers and the non-structural fibers which are in a fiber form in the composite (claim 1).

A preform is known as an assembly of dry fibers that constitutes the reinforcement component of a composite in a form suitable for use in a liquid composite molding process. A preform is typically an assembly of various textile forms such as fabrics, braids or mats, tailored or shaped as necessary, and is assembled as a specific operation prior to being placed into or on a mold tool. In contrast, '087 does not disclose a preform but instead discloses a prepreg, a fiber reinforcement impregnated with an uncured resin that is laminated, formed and cured to obtain the intended product (EP '087, col. 1, lines 17-22). Therefore, since '087 fails to disclose a preform, it does not anticipate claims 1-6, 8, 10, 12,

12, 19 and 20. Reconsideration and withdrawal of the rejection of 1-6, 8, 10, 12, 13, 19, 20 under 35 USC §102 are thus earnestly solicited.

Claims 1-6, 10, 12, 13 are rejected under 35 USC §102 for allegedly being anticipated by EP 488 389. This rejection is hereby traversed.

In EP '389, like in EP '087, the disclosed composite is a prepreg, not a preform, EP '389 therefore fails to anticipate the present invention. Reconsideration and withdrawal of the rejection of claims 1-6, 10, 12, 13 under 35 USC §102 are thus earnestly solicited.

Claim rejections – 35 USC §103

Claims 1-7, 11, 14-18, 21-25 are rejected under 35 USC §103 for allegedly being unpatentable over EP 632 087 in view of EP 630 736. This rejection is hereby traversed.

The Office Action contends that EP 632 087 differs from the claimed invention because it is silent about the plurality of textile layers and the additional veil layer of thin woven or nonwoven material. EP '736 is offered as describing fabric used for processing fiber reinforced composite which is made from a thermoplastic matrix component which can be crystalline. The Office Action then concludes that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the multicomponent fibers and other fibers as the veil or additional layers of EP '736 in the composite of EP '087 motivated with the expectation that this is routine in the composite art in order to provide more strength to the improved composite."

However, as set forth above in response to the rejection under 35 USC §102, EP '087 in addition to failing to disclose a plurality of textile layers and an additional veil layer of thin woven or nonwoven material, differs from the claimed composite in failing to disclose a preform, instead disclosing a prepreg. EP '736 also directed to prepregs, fails to make up for this deficiency of EP '087. So combining EP '087 with EP '736, assuming there were some motivation to do so, teaches another prepreg, not the claimed preform.

Prepregs do not present the same processing challenges as preforms. Prepregs are generally flat, planar fiber reinforced structures that are pre-impregnated with a resin. While prepregs can suffer from handling problems such as non-drapability and limited shelf life, they are generally cured under vacuum with heat and/or pressure to ensure full impregnation of the resin during cure. Preforms, on the other hand are tailored or shaped as necessary and assembled prior to being placed into or on a mold tool. These preforms in the mold are then injected or infused with liquid resin and then cured. Such liquid composite molding technologies are thought to be the solution to the problem of making composite parts in a number of intractable situations, such as large aerospace primary structures and high volume structural automotive components. The benefits that liquid composite molding technologies are perceived to offer over conventional prepregs are reduced scrap and lay-up time, non-dependence upon drape and increased shelf life properties. However, liquid

composite molding does have its own problems, particularly when the end use applications require high toughness and where control of curing cycle time is critical. The solution to introducing toughness in an aerospace composite has traditionally been to toughen the matrix – usually by introducing a second phase additive such as a thermoplastic polymer to the base epoxy resin matrix. The thermoplastic may be blended with the unreacted thermoset resin at elevated temperatures to produce a single phase unreacted melt. This approach is limited by the level of thermoplastic that can be added to enhance toughness. As the high molecular weight thermoplastic dissolves into the resin, the viscosity of the blend rises steeply. The nature of the process of introducing the resin into the reinforcing fibers of the preform requires that resin properties such as viscosity and elasticity are such as to allow infiltration of the resin throughout the fabric preform. This is essential if the resulting composite structure is to be free of voids and long injection time and high injection temperatures are to be avoided. The present invention addresses this problem by removing the toughening agent from the resin and putting it in the structural reinforcement of the composite as a fiber. The less viscous resin is then more easily injected into the preform prior to curing. No such problem or solution is offered in neither EP '087 nor EP '736, both directed to prepregs.

Claims 1-7, 11, 14-18, 21-25 would therefore not have been obvious over EP 632 087 in view of EP 630 736. Reconsideration and withdrawal of their rejection under 35 USC §103 are thus earnestly solicited.

In view of the foregoing, favorable consideration and prompt allowance of claims 1-8 and 10-29 are thus earnestly solicited. Should the Examiner not yet consider these claims in condition for allowance, he is requested to telephone the undersigned before taking further action.

Respectfully submitted,

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Invention: COMPOSITE COMPRISING STRUCTURAL AND NON STRUCTURAL FIBERS

I hereby certify that the following correspondence:

Request for Reconsideration (3 pages) and Request for Extension of Time (1 page in duplicate).

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